WHAT IS CLAIMED IS:

1. An optical inspection system, comprising:
a light source outputting an annular beam;
an objective lens focusing the annular beam at a target; and
a detector receiving light scattered from the target, through the objective lens.

2. The optical inspection system as set forth in claim 1, wherein:
the light source also outputs a circular beam;
the objective lens focuses the circular beam at the target; and
the detector receives light reflected from the target through the objective lens.

3. The optical inspection system as set forth in claim 2, wherein the light source produces a selected one of the annular beam and the circular beam in response to a selection of imaging operation type.

4. The optical inspection system as set forth in claim 3, wherein, when the imaging operation type is bright field imaging, the light source is controlled to produce

the circular beam, and, when the image operation type is dark field imaging, the light source is controlled to produce the annular beam.

5. The optical inspection system as set forth in claim 1, wherein:

the detector receives the scattered light, as dark field detection, through a portion of the objective lens corresponding to an inner part of the annular beam; and

the detector simultaneously receives light reflected from the target, as bright field detection, through a portion of the objective lens corresponding to an outer part of the annular beam.

6. The optical inspection system as set forth in claim 1, further comprising:

a scanner scanning the annular beam along a line in a given scanning direction to provide a scanned single annular beam; and

a multiple beam splitter producing multiple annular beams of substantially identical intensity from the scanned single annular beam.

7. The optical inspection system as set forth in claim 6, wherein:

the detector receives the scattered light, as dark field detection, through a portion of the objective lens corresponding to an inner part of each of the annular beams; and

the detector simultaneously receives light reflected from the target, as bright field detection, through a portion of the objective lens corresponding to an outer part of each of the annular beams.

8. The optical inspection system as set forth in claim 6, wherein the detector is a multiple line CCD camera, and wherein each of the multiple annular beams is imaged on a separate one of the lines of the multiple line CCD camera.

9. An optical inspection system, comprising:

a light source outputting a single beam;

a scanner scanning the single beam along a line in a given scanning direction to provide a scanned single beam; and

a multiple beam splitter producing multiple beams of substantially identical intensity from the scanned single beam.

10. The optical inspection system as set forth in claim 9, wherein the multiple beam splitter produces the

multiple beams with a diffractive optical element having uniform diffraction efficiency.

11. The optical inspection system as set forth in claim 10, wherein the diffractive optical element is a Dammann grating.

12. The optical inspection system as set forth in claim 9, further comprising:

an objective lens focusing the multiple beams at a target; and

a detector receiving light returned from the target, through the objective lens

wherein the detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

13. An optical inspection system, comprising:

a light source outputting a beam; and

a scanner scanning the beam in a beam spot across a target, the target being movable in a target movement direction;

wherein the beam has a scanning direction not perpendicular to the target movement direction.

14. The optical inspection system as set forth in claim 13, wherein the beam spot travels a distance in the mechanical scanning direction that is greater than the distance in between scan lines in the mechanical scanning direction.

15. An optical inspection system, comprising:
a light source outputting a beam;
a confocal optical arrangement; and
optics for focusing the beam at a target and directing captured light to a detector through the confocal optical arrangement.

16. The optical inspection system as set forth in claim 15, further comprising a control unit controlling the focus of the optics based on:
a light level threshold, and
a light level signal indicative of light received by the detector through the confocal optical arrangement.

17. A method for optical inspection, comprising:
generating an annular light beam;
scanning the annular beam along a line in a given scanning direction to provide a scanned single beam; and

splitting the scanned single beam to provide multiple beams of substantially identical intensity from the scanned single beam; and

detecting signals generated from an interaction between the plurality of multiple beams and an inspected object.

18. An optical inspection system, comprising:

a light source providing a beam of light through a pupil;

a multiple beam splitter receiving the light through the pupil;

a scanner receiving the multiple beams and providing scanned multiple beams;

a beam splitter receiving the scanned multiple beams and illuminating a target through an objective lens;

the objective lens collecting light returned back from the illuminated target and passing the collected light through the beam splitter to an imaging lens;

the imaging lens receiving the light passing through the beam splitter and focusing the light to a bright field channel detector.

19. The optical inspection system as set forth in claim 18, wherein the bright field channel detector includes a multiple line CCD camera, and wherein each of the

multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

20. The optical inspection system as set forth in claim 18, further comprising:

an other beam splitter optically disposed between the imaging lens and the bright field channel detector; and

the light from the imaging lens passing through the beam splitter being focused also on a dark field channel detector.

21. The optical inspection system as set forth in claim 20, wherein at least one of the bright field channel detector and the dark field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

22. An optical inspection system, comprising:

a light source providing a beam of light;

a scanner receiving the light through a first beam splitter and providing scanned light;

a second beam splitter receiving the scanned light through a scan lens, and illuminating a target through an objective lens;

the objective lens collecting light returned back from the illuminated target and passing the collected light to the second beam splitter;

the second beam splitter providing part of the collected light, as a returned light signal, back through the scan lens and scanner to the first beam splitter;

the first beam splitter deflecting the returned light signal through a focusing lens and a pinhole; and

one or more detectors receiving the light through the pinhole.

23. The optical inspection system as set forth in claim 22, wherein:

the light source provides the beam of light through a pupil;

a multiple beam splitter receives the light through the pupil;

the light received by the scanner includes multiple beams provided by the multiple beam splitter, and the light scanned by the scanner includes multiple scanned beams;

the second beam splitter provides part of the collected light through an imaging lens to a bright field channel detector.

24. The optical inspection system as set forth in claim 23, wherein the bright field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

25. The optical inspection system as set forth in claim 23, further comprising:

a third beam splitter optically disposed between the imaging lens and the bright field channel detector; and

the light from the imaging lens passing through the third beam splitter being focused also on a dark field channel detector.

26. The optical inspection system as set forth in claim 25, wherein the multiple scanned beams are annular beams.

27. The optical inspection system as set forth in claim 25, wherein at least one of the bright field channel detector and the dark field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

28. The optical inspection system as set forth in claim 23, wherein the multiple beam splitter produces the multiple beams with a diffractive optical element having uniform diffraction efficiency.

29. The optical inspection system as set forth in claim 28, wherein the diffractive optical element is a Dammann grating.

30. The optical inspection system as set forth in claim 22, wherein:

the target is movable in a target movement direction; and

the scanner scans with a scanning direction not perpendicular to the target movement direction.

31. An optical inspection method, comprising:

outputting an annular beam from a light source;

focusing the annular beam at a target; and

detecting light scattered from the target.

32. The optical inspection method as set forth in claim 31, further comprising:

outputting a circular beam from the light source;

focusing the circular beam at the target; and

detecting light reflected from the target.

33. The optical inspection method as set forth in claim 32, further comprising:

selecting an imaging operation type;

producing a selected one of the annular beam and the circular beam in based on the imaging operation type.

34. The optical inspection method as set forth in claim 33, wherein, when the imaging operation type is bright field imaging, the light source is controlled to produce the circular beam, and, when the image operation type is dark field imaging, the light source is controlled to produce the annular beam.

35. The optical inspection method as set forth in claim 31, wherein:

the detecting of the scattered light detects the light scattered through a portion of an objective lens corresponding to an inner part of the annular beam; and

simultaneously with the detecting of the scattered light there is a detection of light reflected from the target, as bright field detection, through a portion of the objective lens corresponding to an outer part of the annular beam.

36. The optical inspection method as set forth in claim 31, further comprising:

scanning the annular beam along a line in a given scanning direction to provide a scanned single annular beam; and

producing multiple annular beams of substantially identical intensity from the scanned single annular beam.

37. The optical inspection method as set forth in claim 36, wherein:

the detecting of the scattered light detects the light scattered through a portion of an objective lens corresponding to an inner part of each of the annular beams; and

simultaneously with the detecting of the scattered light there is a detection of light reflected from the target, as bright field detection, through a portion of the objective lens corresponding to an outer part of each of the annular beams.

38. The optical inspection method as set forth in claim 36, wherein the detecting is performed with a multiple line CCD camera, and includes imaging each of the

multiple annular beams on a separate one of the lines of the multiple line CCD camera.

39. An optical inspection method, comprising:

outputting a single beam;

scanning the single beam along a line in a given scanning direction to provide a scanned single beam; and

producing multiple beams of substantially identical intensity from the scanned single beam.

40. The optical inspection method as set forth in claim 39, wherein the producing of the multiple beams is performed with a diffractive optical element having uniform diffraction efficiency.

41. The optical inspection method as set forth in claim 40, wherein the diffractive optical element is a Dammann grating.

42. The optical inspection method as set forth in claim 39, further comprising:

focusing the multiple beams at a target through an objective lens;

receiving light returned from the target, through the objective lens; and

detecting the returned light with a multiple line CCD camera by imaging each of the multiple annular beams on a separate one of the lines of the multiple line CCD camera.

43. An optical inspection method, comprising:

outputting a beam; and

scanning the beam in a beam spot across a target, the target being movable in a target movement direction;

wherein the beam has a scanning direction not perpendicular to the target movement direction.

44. The optical inspection method as set forth in claim 43, wherein the beam spot travels a distance in the mechanical scanning direction that is greater than the distance in between scan lines in the mechanical scanning direction.

45. An optical inspection method, comprising:

outputting a beam; and

focusing the beam at a target; and

directing captured light to a detector through a confocal optical arrangement.

46. The optical inspection method as set forth in claim 45, further comprising controlling the focus of the optics based on:

a light level threshold, and

a light level signal indicative of light received by the detector through the confocal optical arrangement.

47. An optical inspection method, comprising:

providing a beam of light;

providing scanned multiple beams from the beam of light;

illuminating a target, with the scanned multiple beams, through an objective lens;

collecting light, returned back from the illuminated target, with the objective lens;

passing the collected light through to an imaging lens;

focusing the light of the imaging lens to a bright field channel detector.

48. The optical inspection method as set forth in claim 47, wherein the bright field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

49. The optical inspection method as set forth in claim 47, further comprising:

providing a beam splitter optically disposed between the imaging lens and the bright field channel detector; and

focusing a portion of the light, from the imaging lens, through the beam splitter and also on a dark field channel detector.

50. The optical inspection method as set forth in claim 49, wherein at least one of the bright field channel detector and the dark field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

51. An optical inspection method, comprising:

providing a beam of light;

passing the beam of light through a first beam splitter;

scanning the light received through a first beam splitter to provide scanned light;

passing the scanned light through a scan lens and a second beam splitter, and illuminating a target through an objective lens;

collecting light returned back from the illuminated target;

passing the collected light to the second beam splitter;

providing part of the collected light, as a returned light signal, back through the scan lens and scanner to the first beam splitter;

deflecting the returned light signal, with the first beam splitter, through a focusing lens and a pinhole; and

receiving the light through the pinhole using one or more detectors.

52. The optical inspection method as set forth in claim 51, further comprising:

providing the beam of light, from the light source, through a pupil;

receiving the light through the pupil at a multiple beam splitter;

splitting the beam of light using the multiple beam splitter;

providing the scanned light as multiple scanned beams;

providing part of the collected light, from the second beam splitter, through an imaging lens to a bright field channel detector.

53. The optical inspection method as set forth in claim 52, wherein the bright field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

54. The optical inspection method as set forth in claim 52, further comprising:

providing a third beam splitter optically disposed between the imaging lens and the bright field channel detector; and

focusing the light from the imaging lens through the third beam splitter also onto a dark field channel detector.

55. The optical inspection method as set forth in claim 54, wherein the multiple scanned beams are provided as annular beams.

56. The optical inspection method as set forth in claim 54, wherein at least one of the bright field channel detector and the dark field channel detector includes a multiple line CCD camera, and wherein each of the multiple annular beams is received on a separate one of the lines of the multiple line CCD camera.

57. The optical inspection method as set forth in claim 52, wherein the multiple beam splitter is a diffractive optical element having uniform diffraction efficiency.

58. The optical inspection method as set forth in claim 57, wherein the diffractive optical element is a Dammann grating.

59. The optical inspection method as set forth in claim 51, wherein:

the target is movable in a target movement direction; and

the scanner scans with a scanning direction not perpendicular to the target movement direction.